UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 7,124,067 B2
APPLICATION NO. : 09/981684
DATED : October 17, 2006
INVENTOR(S) : Maria-Grazia Ascenzi

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Amendments to the Specification:

Please replace the paragraph at col. 4, lines 21-24 with the following amended paragraph:

FIG. **1**. A schematic representation of the upper third of the tibia; i.c.s. and o.c.s. stand for inner and outer circumferential systems, respectively. Both compact and cancellous bone are represented <u>(from Bonucci, 2000, Basic composition and structure of bone. In: Mechanical Testing of Bone (An Y. and Draughn R. eds.) pp. 3-21, CRC Press, Boca Raton, Florida)</u>.

Please replace the paragraph at col. 4, lines 25-32 with the following amended paragraph:

FIGS. **2**(*a*) and (*b*). (a) Diagram of a diaphysis sector of cortical long bone. The osteons or haversian system (HA) are located between the outer OL and inner IL circumferential lamellae. The osteonic lamellae are disposed cylindrically around the haversian canal (HC) <u>(from Bouligand et a1., (1985) Spatial organization of collagen fibrils in skeletal tissues: analogies with liquid crystals. In: Bairati A. Garrone R (eds.) Biology of invertebrate and lower vertebrate collagens. Plenum Publishing Corp.)</u>. (b-d) Cross-sectioned osteons as seen (b) under a light microscope; (c) in a microradiograph; and (d) under the polarizing microscope <u>(from Bonucci, 2000)</u>.

Please replace the paragraph at col. 4, lines 33-38 with the following amended paragraph:

FIGS. **3**(*a*) and (*b*). (a) Section of the body of a lumbar vertebra showing vertical and horizontal trabeculae. The upper and lower surfaces correspond to articular cartilage <u>(from Bonucci, 2000)</u>. (b) Section of half of tibia's upper third. The cancellous bone of the metaphysis consists of comparatively think vertical trabeculae connected by thin trabeculae <u>(from Bonucci, 2000)</u>.

Please replace the paragraph at col. 4, lines 49-51 with the following amended paragraph:

FIGS. **6**(*a*)-(*c*). (a) Types of pure forces<u>;</u>[[.]] (b) Definition of stress on an area on which the force is constant<u>;</u>[[.]] (c) Definition of unidirectional strain for D much smaller than L <u>(from Evans F. G., Mechanical Properties of Bone, Thomas, Springfield, 1973)</u>.

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Please replace the paragraph at col. 4, lines 52-58 with the following amended paragraph:

FIGS. **7**(*a*) and (*b*). (a) Tensile and compressive stress distribution during torsion in a material, such as macroscopic bone, which is weaker in tension than in shear;[[.]] (b) Shearing stress on the cross section of a specimen subjected to torsion. The arrows' length indicates the magnitude of the shearing stress, which progressively increases from the center to the periphery of the specimen (from Evans, 1973).

Please replace the paragraph at col. 5, lines 12-23 with the following amended paragraph:

FIGS. **9**(*a*)-(*c*). (a) The osteonic lamellar model is a laminate, which consists of fiber-reinforced unidirectional laminae. (b) The interstitial lamellar model is a portion of the osteonic lamellar model. The figure shows three thin laminae (lamellae) and a thick lamina (portion of cement line) (from Crolet, J.M., Aoubiza, B., and Meunier, A., Compact bone: numerical simulation of mechanical characteristics. J. Biomechanics. (26):677-687. 1993). (c) On a small laminar element of constant thickness, the principal material axes are labeled **1**, **2**, and **3**. Direction **1** is parallel and direction **2** is perpendicular to the fibers. Direction **3** is the radial direction perpendicular to the page. Circumferential and axial directions are labeled Θ and z. The angle between the circumferential direction and direction **1** is called γ (from Ascenzi, M.-G. (1999) A first estimation of prestress in so-called circularly fibered osteonic lamellae, J. Biomechanics. (32): 935-942).

Please replace the paragraph at col. 5, lines 24-25 with the following amended paragraph:

FIG. **10**. Shows a device for subjecting bone to torsional cyclical loading (from Ascenzi, A. Baschieri, P. Benvenuti, A. (1994) The torsional properties of single selected osteons. J. Biomechanics, 27(7): 875-884).

Please replace the paragraph at col. 5, lines 26-31 with the following amended paragraph:

FIG. **11**. A schematic diagram of a device for subjecting bone to torsional cyclical loading, where **(1)** is a rotational axis with jaws; **(2)** and **(3)** are hard metal wedges of a pendulum loading system; **(4)** is a wheel around which a tungsten thread loaded with weights is attached; **(5)** is the axis of the pendulum; and **(6)** is a mirror (from Ascenzi, A. Baschieri, P. Benvenuti, A. (1994) The torsional properties of single selected osteons. J. Biomechanics, 27(7): 875-884).

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Please replace the paragraph at col. 5, lines 35-37 with the following amended paragraph:

FIG. **13**. A diagram that shows that around each osteon sample, a trapezoid was cut with a blade under a stereo microscope (from Ascenzi, M.-G, Ascenzi, A., Burghammer, M., Panzavolta, S., Benvenuti, A. and Bigi, A. (2003) Structural differences between "dark" and "bright" isolated human osteonic lamellae, J. Structural Biology, 141, 22-33).

Please replace the paragraph at col. 5, lines 38-40 with the following amended paragraph:

FIG. **14**. A diagram that shows that after isolation, each lamellar sample was carefully straightened to a ribbon-like shape (from Ascenzi, A. Benvenuti, A. Bonucci, E. (1982) The tensile properties of single osteonic lamellae: technical problems and preliminary results. J. Biomechanics, 15(1): 29-37).

Please replace the paragraph at col. 5, line 41 with the following amended paragraph:

FIG. **15**. A larger view of the lamella described in FIG. **14** (from Ascenzi, A. Benvenuti, A. Bonucci, E. (1982) The tensile properties of single osteonic lamellae: technical problems and preliminary results. J. Biomechanics, 15(l): 29-37).

Please replace the paragraph at col. 5, line 42 with the following amended paragraph:

FIG. **16**. A lamella after tensional testing (from Ascenzi, A, Benvenuti, A, Bonucci, E. (1982) The tensile properties of single osteonic lamellae: technical problems and preliminary results. J. Biomechanics, 15(1): 29-37).

Please replace the paragraph at col. 5, lines 50-52 with the following amended paragraph:

FIGS. **20** (*a*)-(*h*). Isolated and flattened bright lamella under the confocal microscope. From border to center, the collagen bundles go from oblique to vertical (from Ascenzi, M.-G, Ascenzi, A., Burghammer, M., Panzavolta, S., Benvenuti, A. and Bigi, A. (2003) Structural differences between "dark" and "bright" isolated human osteonic lamellae. J. Structural Biology, 141, 22-33).

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Please replace the paragraph at col. 5, lines 53-55 with the following amended paragraph:

FIGS. **21** (*a*)-(*g*). Isolated and flattened extinct lamella under the confocal microscope. From one border to the other, the collagen bundles are parallel to the osteonal axis (from Ascenzi, M.-G, Ascenzi, A., Burghammer, M., Panzavolta, S., Benvenuti, A. and Bigi, A. (2003) Structural differences between “dark” and “bright” isolated human osteonic lamellae. J. Structural Biology, 141, 22-33).

Signed and Sealed this

Tenth Day of July, 2007

Jon W. Dudas

JON W. DUDAS
Director of the United States Patent and Trademark Office